CORRECTED AMENDMENTS TO THE CLAIMS

1. (Canceled)

2. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ said control-program-development supporting apparatus comprising a compiler which compiles the control program into codes directly executable by a ~~universal~~ microprocessor that includes an acceleration unit~~, such as pipeline logic and a cache~~.

3. (Previously Presented) The control-program-development supporting apparatus according to claim 2 further comprising an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes and rearranging codes for locally arranging instructions for a common input or output device, wherein a control program optimized by said optimization filtering unit is newly used as the control program.

4. (Previously Presented) The control-program-development supporting apparatus according to claim 2, further comprising a processing-time rough-estimating unit which has a relating table which relates a sample program having a known processing time with the control program corresponding to the execution codes to estimate sequential-processing execution time of a programmable controller in accordance with the relating table.

5. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ said control-program-development supporting apparatus comprising:
a control-program dividing unit which divides the control program into a plurality of blocks; and
a compiler which compiles at least some of the blocks into execution codes directly executable by a programmable controller, wherein the programmable controller includes a microprocessor having an acceleration unit.

6. (Canceled)

7. (Previously Presented) The control-program-development supporting apparatus according to claim 5, wherein the control program is a ladder diagram or an instruction list generated from the ladder diagram, and the control-program dividing unit divides the control program into a plurality of blocks at a predetermined rung in the ladder diagram to generate a program file for every block concerned.

8. (Previously Presented) The control-program-development supporting apparatus according to claim 5, wherein the control program is a ladder diagram or an instruction list generated from the ladder diagram, and the control-program dividing unit divides the control program into a plurality of blocks at a predetermined rung serving as a jump destination for a jump instruction in the ladder diagram to generate a program file for every block.

9. (Currently Amended) The control-program-development supporting apparatus according to claim 5, wherein
the control program is a ladder diagram or an instruction list generated from the ladder diagram, and
the control-program dividing unit extracts at least some rungs including instructions to a common input or output device from the ladder diagram, ~~constitutes one block of~~ at least some of the rungs extracted <u>constituting one block</u>, and generates a program file for every block.

10. (Previously Presented) The control-program-development supporting apparatus according to claim 5 further comprising an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes and rearranging codes for locally arranging instructions for a common input or output device, wherein a control program optimized by said optimization filtering unit is newly used as the control program.

11. (Previously Presented) The control-program-development supporting apparatus according to claim 5, further comprising a processing-time rough-estimating unit which has a relating table which relates a sample program having a known processing time with the control program corresponding to the execution codes to estimate a sequential-processing execution time of a programmable controller in accordance with the relating table.

12. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder~~

~~diagram or instruction list,~~ said control-program-development supporting apparatus comprising:

a control-program dividing unit which divides the control program into a plurality of blocks;

a control-program converting unit which converts at least some of the blocks into ~~advanced~~high-level-language control programs described with a universal-computer-readable ~~advanced~~ high-level language for every block; and

a compiler which compiles at least some of universal-computer-readable ~~advanced~~ high-level programming languages corresponding to every block into codes directly executable by a programmable controller.

13. (Currently Amended) The control-program-development supporting apparatus according to claim 12, wherein the programmable controller is provided with a ~~universal~~ microprocessor that includes an acceleration unit~~, such as pipeline logic and a cache~~.

14. (Previously Presented) The control-program-development supporting apparatus according to claim 12, wherein

the control program is a ladder diagram or an instruction list generated from the ladder diagram, and

the control-program dividing unit divides the control program into a plurality of blocks at a predetermined rung in the ladder diagram to generate a program file for every block.

15. (Previously Presented) The control-program-development supporting apparatus according to claim 12, wherein the control program is a ladder diagram or an instruction list generated from the ladder diagram, and the control-program dividing unit divides the control program into a plurality of blocks at a predetermined rung, serving as a jump destination for a jump instruction in the ladder diagram, to generate a program file for every block.

16. (Previously Presented) The control-program-development supporting apparatus according to claim 12, wherein

the control program is a ladder diagram or an instruction list generated from the ladder diagram, and

the control-program dividing unit extracts at least some of rungs including instructions to a common input or output device from the ladder diagram, constituting one block of at least some of the extracted rungs, and generates a program file for every block.

17. (Previously Presented) The control-program-development supporting apparatus according to claim 12 further comprising an optimization filtering unit which reconstructs the control program into an optimum code system by excluding not-cited variables and redundant codes and rearranging codes for locally arranging instructions for a common input or output device, wherein a control program optimized by said optimization filtering unit is newly used as the control program.

18. (Original) The control-program-development supporting apparatus according to claim 12, further comprising:

a processing-time rough-estimating unit which has a relating table which relates a sample program having the processing time already known with the control program corresponding to the execution codes to estimate a sequential-processing execution time of a programmable controller in accordance with the relating table.

19. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ said control-program-development supporting apparatus comprising:

a control-program converting unit which converts the control program into ~~an advanced~~ a high-level-programming-language control program described with a universal-computer-readable ~~advanced~~ high-level programming language;

a debugging-code generating unit which generates a debugging control program by inserting a line number into a part corresponding to each line, constituting the instruction list in source codes, constituting the ~~advanced~~high-level-programming-language control program; and

a debugging executing unit which displays each line of the instruction list and the execution part of the ~~advanced~~high-level -programming-language control program by relating the former with the latter.

20-22. (Canceled)

23. (Currently Amended) A programmable controller which performs sequential processing in accordance with a control program described with a sequential-control

language, ~~such as a ladder diagram or instruction list,~~ said programmable controller comprising:

a storing unit which stores the control program;

an instruction counting unit which counts the appearance frequency of each instruction used for execution of the control program;

a pattern-matching-table generating unit which generates a pattern-matching table in which instructions are listed starting with the highest appearance frequency in accordance with results counted by the instruction-counting unit; and

an interpreting unit which executes the control program while pattern-matching the instructions listed in the pattern-matching-table in order and interpreting the control program into codes directly-executable by the programmable controller.

24. (Currently Amended) A control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ said control-program-development supporting apparatus comprising:

an instruction counting unit which counts the appearance frequency of each instruction used for the control program;

a pattern-matching-table generating unit which generates a pattern-matching table in which instructions are listed starting with the highest appearance frequency, in accordance with results counted by the instruction-counting unit; and

a compiler which compiles the control program into codes directly executable by the programmable controller while pattern-matching the instructions listed in the pattern matching table in order.

25. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a ~~universal~~ microprocessor including an acceleration unit, ~~such as a pipeline logic and a cache,~~ and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ the control-program-development supporting apparatus having a compiler which compiles the control program into codes directly executable by a ~~universal~~ microprocessor that includes an acceleration mounting unit, ~~such as a pipeline logic and a cache.~~

26. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a ~~universal~~ microprocessor ~~which includes~~ including an acceleration mounting unit, ~~such as pipeline logic and a cache,~~ and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language ~~such as a ladder diagram or instruction list~~, the control-program-development supporting apparatus having,

a control-program dividing unit which divides the control program into a plurality of blocks; and

a compiler which compiles at least some of the blocks into execution codes directly executable by a programmable controller.

27. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a ~~universal~~ microprocessor ~~which includes~~ including an acceleration mounting unit, ~~such as pipeline logic and a cache,~~ and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program, described with a sequential-control language ~~such as a ladder diagram or instruction list~~, the control-program-development supporting apparatus having,

a control-program dividing unit which divides the control-program into a plurality of blocks;

a control-program converting unit which converts at least some of the blocks into ~~advanced~~high-level-language control programs described with a universal-computer-readable ~~advanced~~ high-level language for every block; and

a compiler which compiles at least some of universal-computer-readable ~~advanced~~ high-level programming languages corresponding to every block into codes directly executable by a programmable controller.

28. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a ~~universal~~ microprocessor including an acceleration mounting unit, ~~such as pipeline logic and a cache,~~ and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ the control-program-development supporting apparatus having,

a control-program converting unit which converts the control program into ~~an advanced~~ a high-level-programming-language control program described with a universal-computer-readable ~~advanced~~ high-level programming language;

a debugging-code generating unit which generates a debugging control program by inserting a line number into a part corresponding to each line constituting the instruction list, in source codes constituting the ~~advanced~~high-level-programming-language control program; and

a debugging executing unit which displays each line of the instruction list and the execution part of the ~~advanced~~high-level-programming-language control program by relating the former with the latter.

29. (Currently Amended) A programmable controller that performs sequential processing in accordance with execution codes generated by compiling a control program, said programmable controller comprising:

a storing unit which stores the execution codes;

a ~~universal~~ microprocessor including an acceleration unit, ~~such as pipeline logic and a cache,~~ and directly executing the execution codes; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language ~~such as a ladder diagram or instruction list,~~ the control-program-development supporting apparatus having,

an instruction counting unit which counts the appearance frequency of each instruction used for the control program;

a pattern-matching-table generating unit which generates a pattern-matching table in which instructions are listed starting with the highest appearance frequency in accordance with results counted by the instruction-counting unit; and

a compiler which compiles the control program into codes directly executable by the programmable controller while pattern-matching the instructions listed in the pattern matching table in order.

30. (Currently Amended) A programmable controller which performs sequential processing in accordance with execution codes generated by compiling a control program, comprising:

a first storing unit which stores the execution codes;

a second storing unit which stores the data for the difference between an execution code stored in the first storing unit and a new execution code;

a microprocessor directly executing the execution codes;

a patch processing unit which changes an execution code currently executed to a new execution code at a predetermined timing in accordance with the difference data and continuously executing the changed execution code; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language, ~~such as a ladder diagram or instruction list,~~ the control-program-development supporting apparatus having a compiler which compiles the control program into codes directly executable by a ~~universal~~ microprocessor that includes an acceleration unit~~, such as pipeline logic and a cache~~.

31. (Canceled).

32. (Currently Amended) A programmable controller which performs sequential processing in accordance with a control program described with a sequential-control language, ~~such as a ladder-diagram or instruction list,~~ said programmable controller comprising:

a storing unit which stores the control program;

an instruction counting unit which counts the appearance frequency of each instruction used for the control program;

a pattern-matching-table generating unit which generates a pattern-matching table in which instructions are listed starting with the highest appearance frequency in accordance with results counted by the instruction-counting unit;

an interpreting unit which executes the control program while pattern-matching the instructions listed in the pattern-matching table in order and interpreting the control program into codes directly-executable by the programmable controller; and

a control-program-development supporting apparatus that develops a control program described with a sequential-control language ~~such as a ladder diagram or instruction list~~, the control-program-development supporting apparatus having a compiler which compiles the control program into codes directly executable by a ~~universal~~ microprocessor that includes an acceleration unit~~, such as pipeline logic and a cache~~.

33. (New) The control-program-development supporting apparatus according to claim 2 wherein said acceleration unit includes pipeline logic and a cache.

34. (New) The programmable controller according to claim 24 wherein said acceleration unit includes pipeline logic and a cache.

35. (New) The programmable controller according to claim 26 wherein said acceleration mounting unit includes pipeline logic and a cache.

36. (New) The programmable controller according to claim 27 wherein said acceleration mounting unit includes pipeline logic and a cache.

37. (New) The programmable controller according to claim 28 wherein said acceleration mounting unit includes pipeline logic and a cache.